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Cyber Security R&D (NE-1) and (NEET-4)

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Cyber Security for Nuclear Systems (the threat is real)

- July 2014 - China Hacks Canadian National Research Council
- March 2014 – China Hacks OPM
- 2011-2014 – Russian Cyber attacks against U.S. Energy Companies
- January 2013 – Department of Energy Hacked
- October 2011 - China Hacks Iron Dome (Israel's missile defense)

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Regulatory Framework for Cyber Security

- **10 CFR 73.54, "Protection of Digital Computer and Communication Systems and Networks"**
  - requires licensees to protect digital computer and communications systems and networks associated with the following categories of functions, from those cyber attacks identified in 10 CFR 73.54(a)(2):
    - safety-related and important-to-safety functions
    - security functions
    - emergency preparedness functions, including offsite communications, and
    - support systems and equipment which, if compromised, would adversely impact safety, security, or emergency preparedness functions.

- **Regulatory Guide 5.71, "Cyber Security Programs for Nuclear Facilities"**
  - Guidance for meeting 10 CFR 73.54

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Regulatory Framework for Cyber Security

- **Regulatory Guide 1.152, Rev. 3, "Criteria for Use of Computers in Safety Systems of Nuclear Power Plants"**
  - guidance for establishing a "Secure Development and Operational Environment (SDOE)"
  - endorses provisions of IEEE Standard 7-4.3.2-2003

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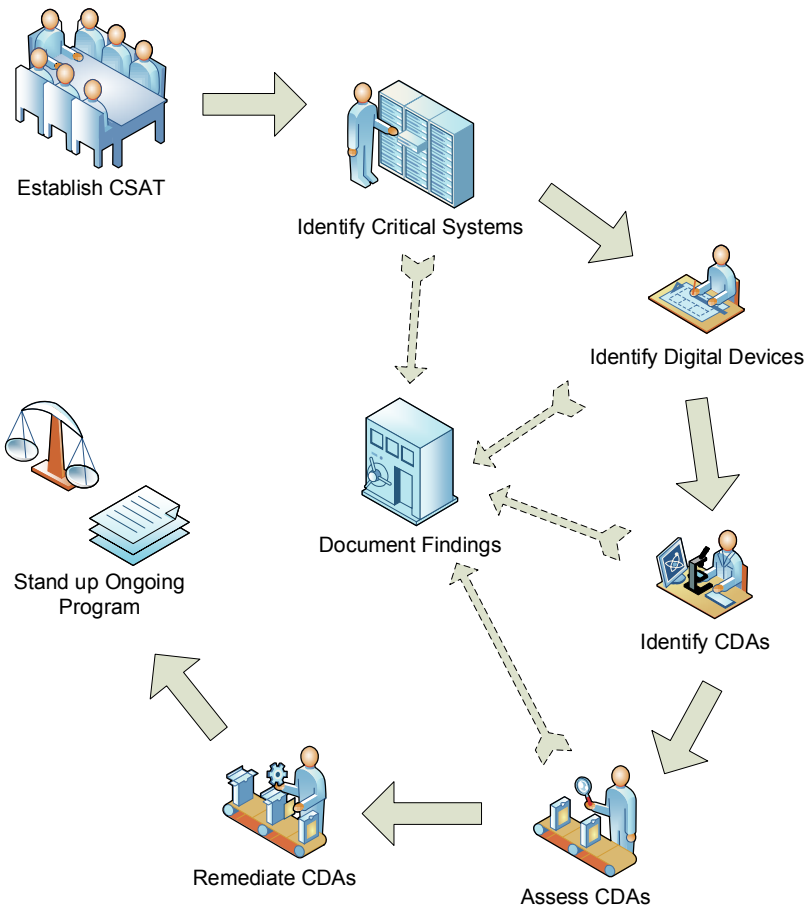
Implementing Cyber Security

Establish Cyber Security Assessment Team



Implement Portable and Mobile Device Controls

Identify Critical Systems and Critical Digital Assets

Implement ongoing program for Cyber Security

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Purpose of Cyber Security R&D

- To reduce the vulnerability
- To mitigate the consequence
- To lower the costs
- To provide a partner

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Sample Cyber Security R&D Needs

Cyber-hardened Sensors and Networks

- Technologies and methodologies to assure secure sensors, networks and communication systems
- Technologies and methodologies to test the security of sensors, networks and communication systems

Modeling and Simulation

- Methodologies to apply nuclear simulation codes to evaluate the consequences of cyber attacks
- Experiments to validate such methods
- Risk based methodologies for prioritizing vulnerabilities

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Sample Cyber Security R&D Needs

- **Personnel Protection Systems and Insider Threat**
  - Technologies and methodologies needed to measure security effectiveness, predict emerging threat risk trends and predict security performance anomalies that may increase personnel and their private systems' exposure to cyber targeting

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NEET vs NEUP

- **NEET seeks broadly applicable nuclear sector R&D**
  - Develop a methodology to resolve consequences from cyber attacks
  - Demonstrate an application of the methodology
- **NEUP seeks Research Reactor specific R&D**
  - Identify a potential vulnerability
  - Conduct analyses and/or experiments to evaluate the vulnerability
  - Use lessons learned in the curriculum
- **Awards are not intended to assist with regulatory compliance issues**

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Contact Information

- For NEET and NEUP, interested parties may contact the INL cyber security program manager at steven.harenstein@inl.gov
- Interested parties may contact me as well at trevor.cook@nuclear.energy.gov